

CITY PLOUGH

LSP3400, LSP3700, LSP4000

MEIREN ENGINEERING OÜ

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USER MANUAL
2015

MEIREN^{SNOW}
Push your limits. Expand your boundaries.

CONTENT

CE DECLARATION OF CONFORMITY	3
FOREWORD	4
GENERAL SAFETY REQUIREMENTS	4
PERSONNEL	4
1. PRODUCT DESCRIPTION	4
1.1. SPECIFICATION OF THE STANDARD EQUIPPED CITY PLOUGH	5
1.2. ADDITIONAL EQUIPMENT	5
2. SAFETY REQUIREMENTS FOR OPERATING THE SNOW PLOUGH	6
3. MOUNTING AND DEMOUNTING OF A PLOUGH	7
4. WORKING WITH THE PLOUGH.....	8
4.1 ADJUSTING OF PLOUGH BLADES.....	9
4.2 USAGE OF SKID SHOE AND WHEELS	9
5. MAINTENANCE OF THE SNOW PLOUGH.....	10
5.1 GREASE POINTS	11
6. WARRANTY CONDITIONS OF THE PRODUCT	12

TABLES

Table 1. Technical specification of the plough	5
------------------------------------------------------	---

DRAWINGS

Drawing 1. Wedge bolts	5
Drawing 2. Safety marking: ACCIDENT RISK!.....	7
Drawing 3. Mounting and demounting of a plough (Finnish fastening system).....	8
Drawing 4. Adjustment of plough blades	9
Drawing 5. Usage of a skid shoe and wheels.....	10
Drawing 6. Grease points	11

CE DECLARATION OF CONFORMITY

Manufacturer: Meiren Engineering OÜ
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We hereby declare that the below mentioned product:

City plough

MEIREN^{SNOW} LSP

Model:

Serial number:

Manufacturing date:

meets the following directives and standards:

2006/42/EC
EN 349:1993+A1:2008

FOREWORD

Thank you for choosing this Meiren Snow product! This user manual contains the technical specifications of the LSP snow plough series, the product usage and maintenance instructions and the warranty terms and conditions. The LSP snow plough series is designed for removal of loose snow from hard-surface roads. This product is not suitable for removal of sand, gravel, packed snow, ice, etc. Inexpedient application of the snow plough can result in economic losses and cause human bodily harm. That is why it is essential for the person operating the snow plough to read the manual carefully and use the product in compliance with the stipulated requirements. Any misuse of the product shall release the manufacturer from liability to compensate for resulting damage and losses.

GENERAL SAFETY REQUIREMENTS

As the construction of the product is complex and it contains moving parts, it is of the utmost importance that the person working with the equipment be aware of all safety risks. To reduce the risks it is important that

- the operator have read through the operator manual;
- the operator have been given an appropriate training, which gives him the permit to use a product of this type in his work;
- the operator have been provided with all necessary tools and is wearing suitable working clothes.

PERSONNEL

This product may only be used and maintained by properly trained personnel. The operator's employer is obliged to ensure fulfilment of all user instructions and safety requirements stipulated by the manufacturer.

Before starting working with the plough, please be sure to read carefully through the operator's manual.

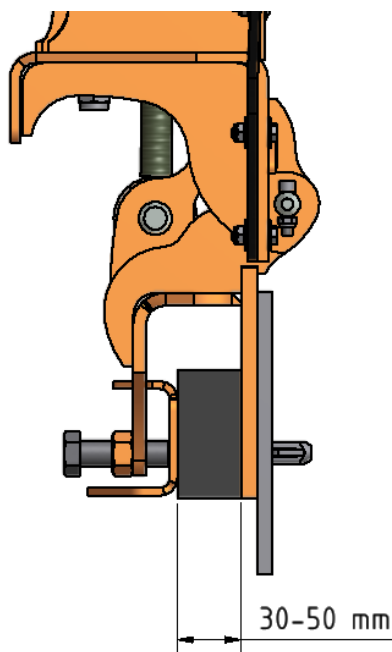
1. PRODUCT DESCRIPTION

LSP3400, LSP3700 and LSP4000 city ploughs have four independent sections with advanced spring mechanisms and blade holders with adjustable angles. The blade of the LSP-series ploughs is partially made of plastic. The benefits of a blade partially made of plastic compared to a steel blade are increased rust resistance, lower noise level and lighter weight. For plastic material we use a special frost and wear-resistant plastic sheet with a thickness of 8 mm. Indices 3400 and 4000 used in the marking of the plough show the approximate total width of the cutting edge of the blade in millimetres.

The snow plough can be equipped with rubber or steel blades. Blades can be fixed with either standard or special wedge bolts meant for quick blade change. To avoid the wedge bolt falling out from the hole while changing the steel blades, then push the 30-50mm rubber strip against the wedge bolt head by using the quick fastening of the rubber blade (see Drawing 1). It is not necessary when using the steel blade with a rubber blade at the same time.

Sidelights and safety flags are available as options. A plough equipped with steel blades can be provided with skid shoe or wheels.

The plough is manufactured from high-strength steel. The product is finished with polyurethane paint that has better wear-resistance compared to conventional paints.

**Drawing 1. Wedge bolts**

	LSP3400	LSP3700	LSP4000
Total width of cutting edges, mm	3410	3670	3995
Plough operational width at maximum turning angle, mm	2665	2860	3120
Total width of the plough blade, mm	3885	4000	4480
Plough internal height (with blades), mm	1085	1100	1080
Plough maximum turning angle (in both directions)	39°	39°	39°
Blade incline in relation to road surface, default factory value	90° +/- 15°	90° +/- 15°	90° +/- 15°
Total weight of the blade (excluding cutting edges and additional equipment), kg	900	920	975
Recommended operating pressure of the hydraulic circuit, bar	160...200		
Recommended capacity of the hydraulic pump, l/min	30...50		

Table 1. Technical specification of the plough

1.1. Specification of the standard equipped city plough

- Parallelogram (lifting frame of the plough)
- A blade including a rotation and lifting cylinder
- 3/8-inch hoses with 1/2-inch quick couplers
- Blade holders made of 4 sections with spring mechanisms and adjustable angles
- A hydraulic impact protection valve of the rotation cylinder with a hydraulic battery to reduce lateral impact;
- Safety marking and LED side lights
- Colour: yellow, RAL 1007

1.2. Additional equipment

- A support wheel including an adjustment mechanism, high-strength wheel, air tyre;
- A slide foot with hard alloy plate and adjustment mechanism (or a hard alloy slide foot);
- Electric control box (incl. Wireless remote control)
- A set of steel or rubber cutting edges;

2. SAFETY REQUIREMENTS FOR OPERATING THE SNOW PLOUGH

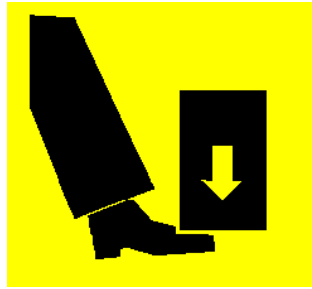
Before operating the plough

- Check that the plough set is complete and that it is in good operational order. It is forbidden to use equipment that is not in good operational order.
- Check that there are no people or objects near the plough, which could be injured or damaged by the plough. In addition safety of people carrying out maintenance of the plough, repairing the plough or moving the plough with the help of hydraulics or any other means has to be ensured. Neglecting of the safety requirements can cause injuries to people (the plough is provided with safety markings, see Drawing 1).
- It is forbidden to work under a plough that is lifted up and not supported.
- Check that the plough is properly fastened to the truck or tractor and that the fastenings are not damaged.
- Check that the safety markings, plough side lights (if provided) and reflectors are in good operational order.
- Check the operational order of cutting edges (if provided also the condition of skid shoe or wheels); The cutting edges shall be adjusted, reversed or replaced latest when the distance between the cutting edge and the fastening openings is less than 26 mm;
- Check the condition of the fastening wedges of the blades;
- Check the condition of levers and fastening pins of the cylinders;
- Check that the hydraulic hoses are intact and properly fastened;
- Check that the plough is properly greased;
- Check that the plough has no damages.

Working with the snow plough

- To operate the plough the person shall be at least 18 years of age, shall have a driving licence of the appropriate category and shall have read through the operation instruction of the snow plough.
- Always pay attention to the surrounding and other traffic, including from the side roads and to the vehicles approaching from the rear. Pay attention to the pedestrians and cyclists not to cause them any risk when working with the snow plough. All warning lights must always be switched on during working!
- Follow the general traffic rules!
- The maximum permitted operation speed of the plough in normal road conditions is **up to 50 km/h**.
- Follow the weather conditions: when it is melting reduce the speed; when the snow is light pay attention to the wind direction and reduce the speed, if necessary.
- When working on soft ground reduce the speed, since the cutting edges may cut in the surface and you may lose control of the truck (or tractor) and the vehicle may run off the road. If the surface is soft support the plough with skid shoe, wheels or an additional blade.
- The plough can only be used for removing loose snow! It is forbidden to use the plough for removing ice, frozen snowdrifts, rock, gravel, sand and other similar material.
- It is forbidden to remove the snow bank at maximum permitted full speed since this may damage the plough.
- It is forbidden to remove snow outside of road boundaries.
- In the event the plough is used on uneven roads or the user "pulls" snow when driving vehicle in reverse where there is a risk of damaging the plough, vehicle or road surface, the user shall bear sole responsibility for such an activity. The manufacturer shall not be liable for any losses caused by the above mentioned activities.
- It is forbidden to attach such additional equipment on the moving parts of the plough that are not approved by the manufacturer.
- It is forbidden to use hydraulically operating equipment as a lifting jack.
- The plough may be lifted only from eye bolts.

Each time there is an incident during operation that could damage the equipment, an inspection of the equipment shall be arranged with the aim of detecting and evaluating possible damages. Damages (cracks in the structure or welded joints, deformed parts) may damage property and cause injuries. It is forbidden to continue work until the damages are repaired.



Drawing 2. Safety marking: ACCIDENT RISK!

3. MOUNTING AND DEMOUNTING OF A PLOUGH

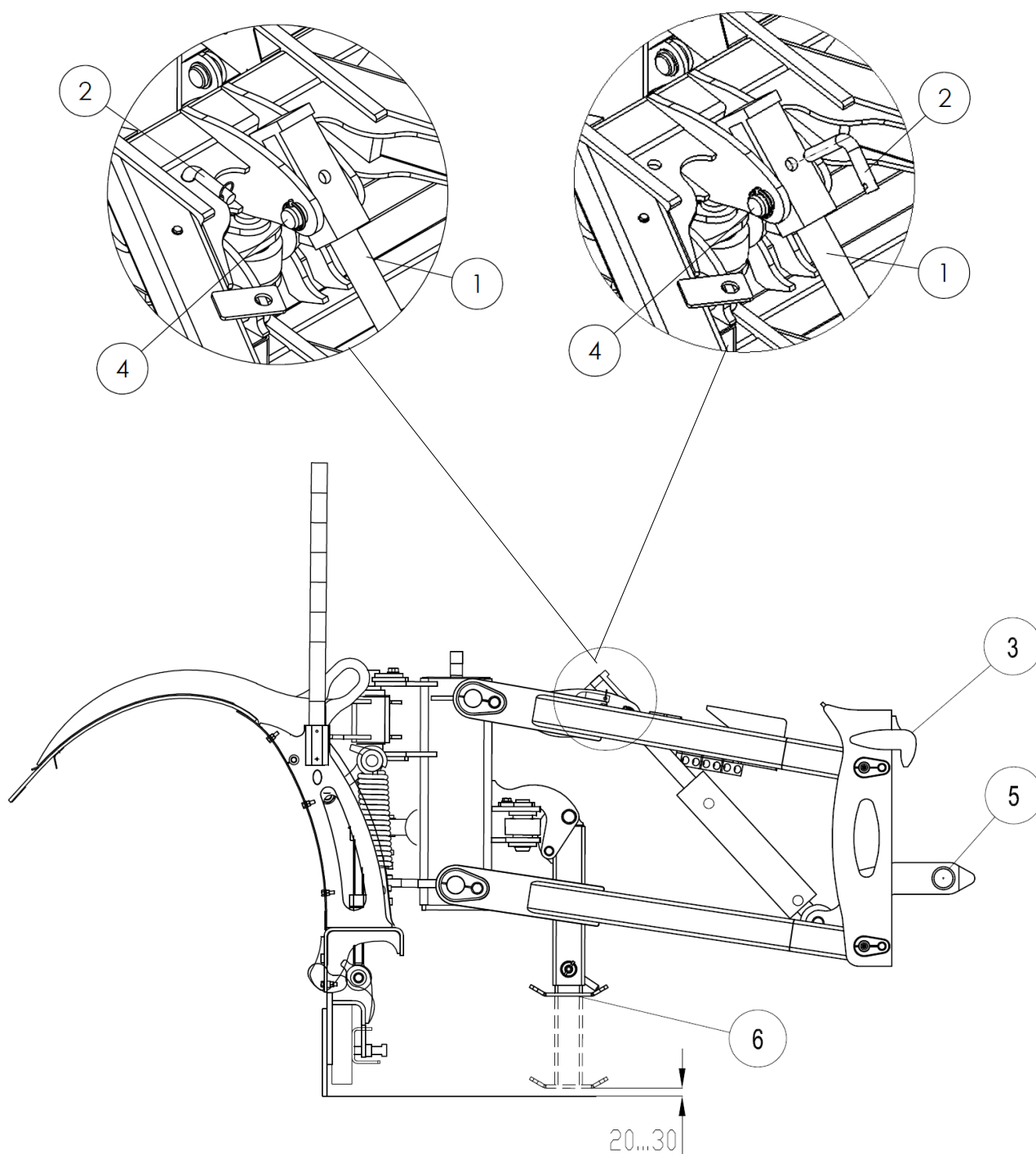
Mounting of a plough on the vehicle (Drawing 3)

- To mount the plough the vehicle must stand on a level surface.
- Drive the vehicle as close to the plough as possible and connect the hydraulic hoses to the hydraulic system of the vehicle.
- Lift the coupling frame of the plough to such a height that the fastening eyes (3) are over the upper edge of the coupling frame of the vehicle.
- Drive the coupling frame of the vehicle against the coupling frame of the plough and lift the plough with lifting cylinders onto the coupling frame of the vehicle.
- Check that the fastening eyes (3) are correctly positioned and lock the coupling frame (5) of the plough on the coupling frame of the vehicle (as the locking systems of ploughs may differ depending on the country please follow the applicable requirements).
- Remove the pin (2) of the lifting cylinder and store it in a holder. Do not leave the pin attached to the cylinder during work! The pin should only be used to mount and demount the plough. If the pin is not removed for the work, the plough will not follow the uneven profile the road and the pin may break. You may leave the pin in place at your own responsibility only in the event the plough is equipped with a hydraulic floating system and the lifting cylinder does not press the plough against the ground.

Demounting of a plough from the vehicle (Drawing 3)

- Install the pin (2) in the control surface opening of the lifting cylinder (1).
- Place the plough on an even ground, the cutting edge must rest on the ground and install the support leg (6) of the plough close to the ground (approx. 20-30 mm from the ground). If you install the support leg completely against the ground when you demount the blade, it is later more difficult to mount the blade on the vehicle (the fastening plate of the plough will be positioned too vertically).
- Loosen the bolts or pins (5) of the coupling frames.
- Lift up the coupling frame (3) of the plough from the frame of the vehicle with the help of the lifting cylinder.
- Disconnect the hoses and drive further.

It is forbidden to lift up the plough with a pin, since the pin is not designed to support loads this heavy and it will bend through!



Drawing 3. Mounting and demounting of a plough (Finnish fastening system)

4. WORKING WITH THE PLOUGH

Before starting work check the pressure of the tyre, if the machine is equipped with a support wheel. The pressure must be **10 bar**. In the event of sharp temperature changes the tyre pressure has to be re-checked.

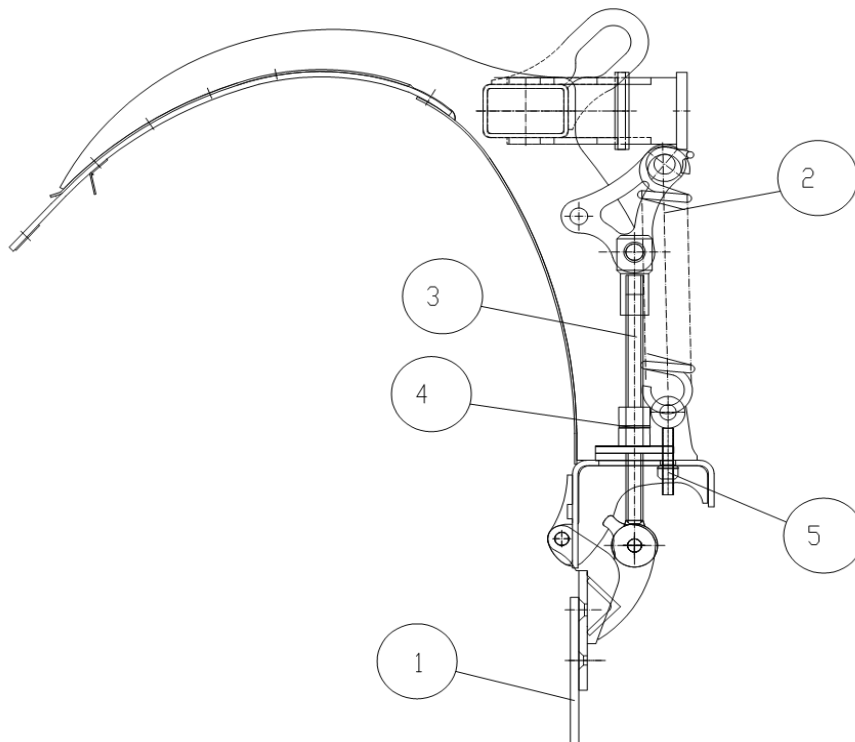
It is very important to use proper working methods and not to overload the plough. For removing thick and heavy snow choose suitable (slow) speed and pay constant attention to the consistency of the snow.

If your model is not equipped with support wheels we do not recommend using standard steel blades, since in contact with hard road surfaces they wear off too quickly. On models with support wheels and skid shoe standard steel blades may also be used, if the weight of the plough does not fall on the blades.

It is not recommended to fully retract or extend the rotation cylinder during work. Approx. 100 mm has to be left for the cylinder travel. In this way it is possible to use the safety valve of the rotation cylinder to reduce more efficiently impacts of possible obstacles. If the plough is driven against an obstacle with a side, the rotation cylinder in the end position may damage the plough and the vehicle.

4.1 Adjusting of plough blades

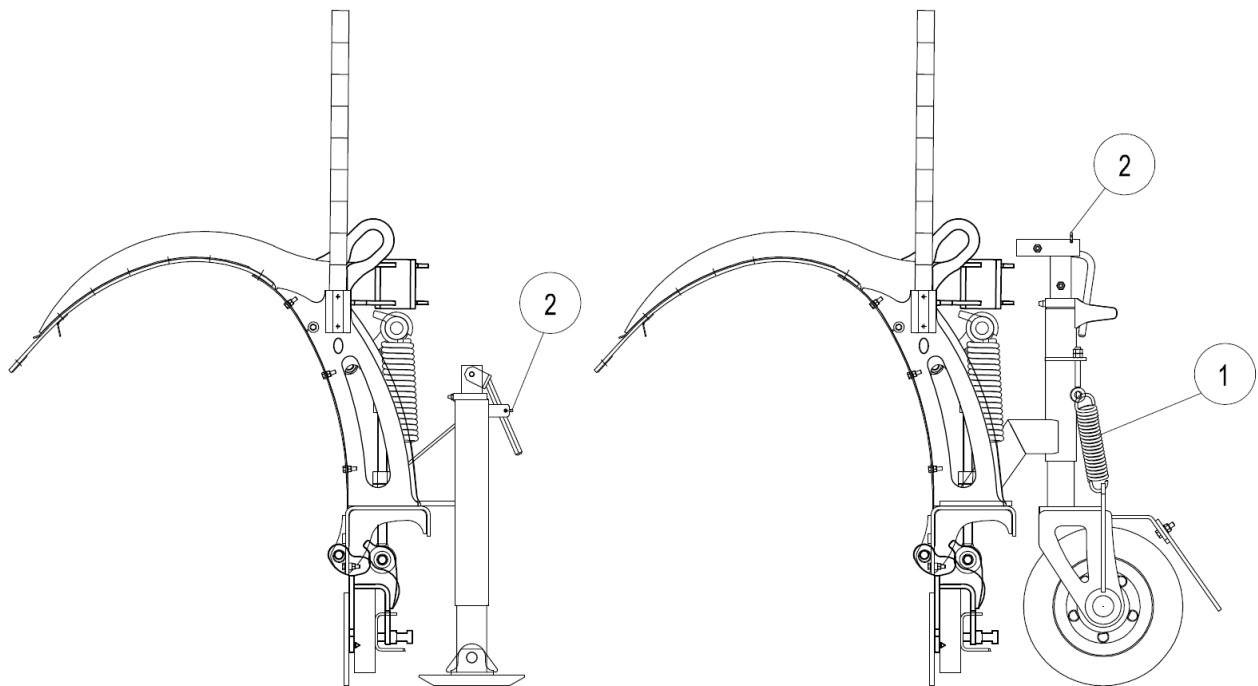
The angle of the first main blades (1, Drawing 3) of the plough can be adjusted in relation to the ground and in addition tension of the springs (2) can be adjusted separately. To change blade angle turn the nuts (4) located in the center of the spring mechanism pusher (3) in one or another direction. After adjustment lock the nuts properly. When working with the steel cutting edge it is recommended that the cutting edge be slightly inclined outside (approx. 10°) but when using a rubber cutting edge the cutting edge must be crosswise in relation to the ground or even slightly inclined backwards, to prevent jumping movements of the plough (rubber is flexible). For adjusting the spring tension tighten the nuts with spring pullers (5).



Drawing 4. Adjustment of plough blades

4.2 Usage of skid shoe and wheels

The wheel or skid shoe shall be adjusted in a way that the steel blade is 0... 15 mm higher from the ground (depending on the road surface). The wheel mechanism spring (1, Drawing 4) is meant to draw the wheel close to the blade in transport position. The spring tension is adjustable but the spring must not be this loose that if the blade is lifted up the wheel will not make a contact with the plough. Regarding the slide foot it shall be checked that it is not too worn, since in this case it may break and fall off. After adjusting of the wheel or slide foot be sure to install the handle split pin (2) to ensure that the wheel or slide foot remains in the desired height.

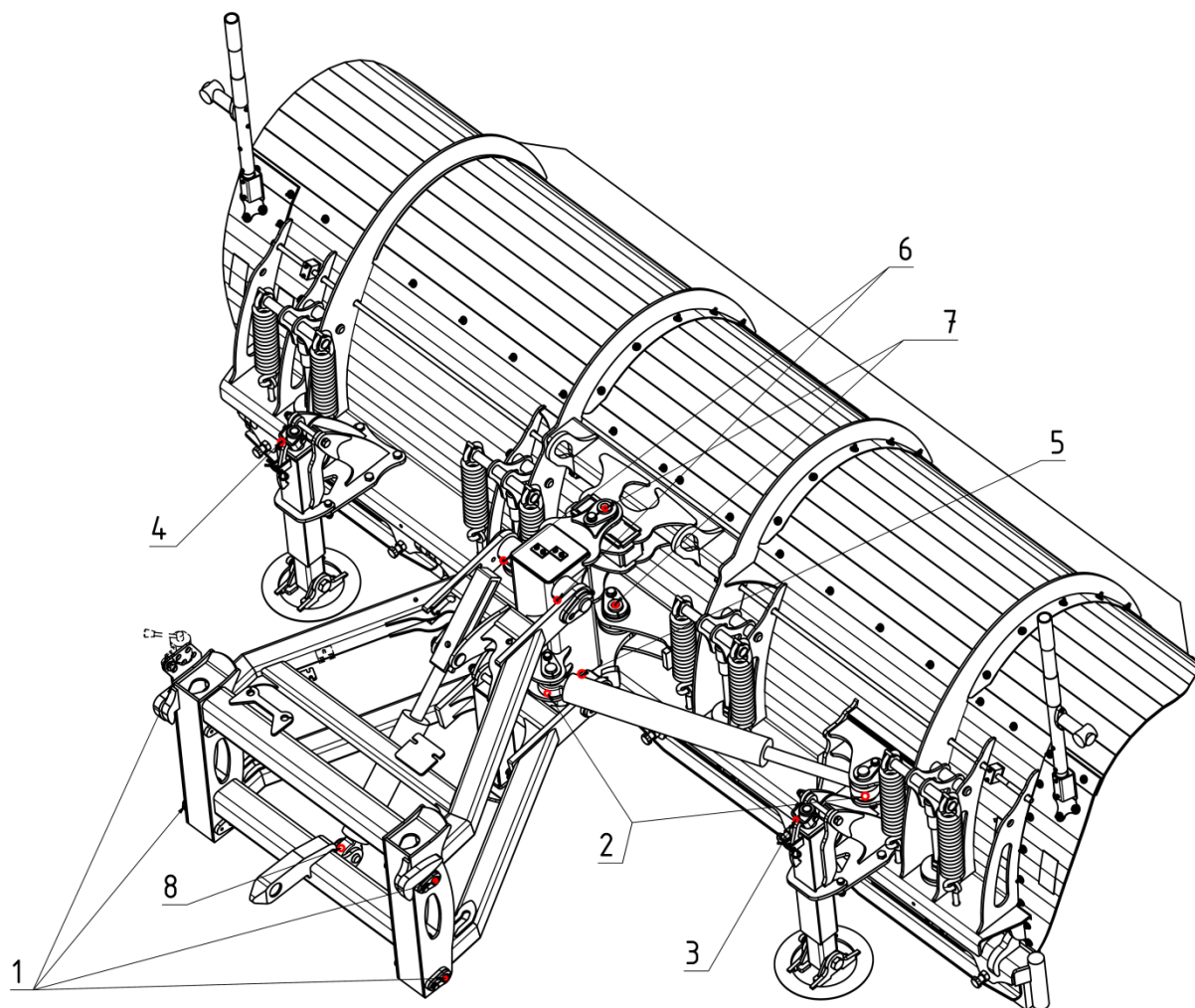


Drawing 5. Usage of a skid shoe and wheels

5. MAINTENANCE OF THE SNOW PLOUGH

MAINTENANCE IN EVERY 8 WORKING HOURS	MAINTENANCE IN EVERY 150 WORKING HOURS	MAJOR SEASONAL MAINTENANCE
Check all bolt connections and hydraulic connections and tighten, if required.	Check all bolt connections and tighten, if required.	Check all bolt connections and tighten, if required.
If the plough is provided with wheels, check the bearing play of the wheels. If the play is too big disassemble the wheel hub, check the bearings and adjust the play (for adjusting use a nut and a special locking washer with pegs.	Grease all grease points: bearings of the rotation and lifting cylinder of the blade, for Norwegian and Danish fastenings also the bearing of the coupling frame. If the plough is provided with skid shoe and wheels grease the regulating mechanism.	Check that there are no leakages in the hydraulic system. If required, tighten the connections of the hydraulic parts and hose ends.
Check that there are no leakages in the hydraulic system. If required, tighten the connections of the hydraulic parts and hose ends.	Check the condition and fastening of cutting edges. If required adjust the cutting edges or replace these.	Spray the zinc coated parts, hydraulic valves and hose ends with rust resistant wax.
Check the condition and fastening of the cutting edges. If required adjust the cutting edges or replace these.	X	Grease all grease points. Also grease or wax the extended adjustment surfaces of the internal pipe of the wheel mechanism.
X	X	Check the plough visually and see if there are parts that need to be replaced.
X	X	Repair all paint damages.
X	X	Retract the piston rod of the cylinder and cover it with proper grease.
X	X	Store the plough in a place exposed to winds but protected from rain and UV-rays.

5.1 Grease points



Drawing 6. Grease points

Pos. nr	Location of grease points	Quantity
1	Midframe	4
2	Rotation cylinder	2
3	Right skid shoe	1
4	Left skid shoe	1
5	Lower lever	2
6	Upper lever	2
7	Pins of bracket	2
8	Lifting cylinder	1
In all		15

6. WARRANTY CONDITIONS OF THE PRODUCT

- The seller shall give the product a warranty period of 12 (twelve) months. The warranty period shall begin when the product is transferred to the purchaser, the delivery time shall be the date specified on the instrument of delivery and receipt or the CMR consignment note.
- The warranty shall cover the elimination of discovered manufacturing, material or structural defects of the product by the seller. The seller shall be obligated to replace the defective product with a new one only if the product or its component parts cannot be repaired or the detail cannot be replaced.
- The purchaser shall agree to notify the seller in writing within 7 (seven) calendar days of becoming aware of the defect, describing the defect with sufficient accuracy.
- The seller shall be required to carry out an expert analysis to identify the causes of the defect within fourteen (14) business days after the purchaser's written notice of the warranty case. If the cause is covered by the warranty, the seller shall eliminate it within 20 (twenty) working days after the expert analysis is carried out.
- Warranty repairs shall be carried out at the shipping address specified in the order confirmation. Repair work of larger scale shall be carried out in the territory of the seller. Cost of transporting the product for warranty repair shall be paid by the purchaser. The purchaser shall cover the expenses and transport costs for repair works excluded from the warranty terms and conditions.
- Warranty shall not cover defects which are caused:
 - as a result of natural wear and tear of the product;
 - as a result of road surface characteristics or damage thereof;
 - in connection with the use of the product contrary to the technical requirements, safety regulations and intended purpose;
 - due to failure to observe the maintenance requirements of the product;
 - due to a traffic accident;
 - of which the purchaser has not notified the seller in writing within 7 (seven) days following its occurrence, and / or the purchaser has not given the seller an opportunity to determine the cause of the defect pursuant to the contract;
 - in the extent to which the increasing of the defect could have reasonably been prevented by the seller.
- Product warranty shall expire prematurely from the time when:
 - the product is repaired independently without acquiring a prior written approval from the seller;
 - the design is changed, additional equipment and / or spare parts have been installed independently without acquiring a prior written approval from the seller.
- In the event that the seller, despite repeated written appeal from the purchaser, fails to fulfill its warranty obligations under the contract, the purchaser shall have the right to repair the product at the cost of the seller. The purchaser must notify the seller in writing at least (5) five business days prior to the replacement or repair of the defective product, and provide a reasonable estimation of the expected cost.
- The purchaser may withdraw from the contract and demand the collection of the product and refund only in the event that there is a defect which cannot be repaired or a part which cannot be replaced, and the replacement of the defective product with a new product would also not give results which would allow using the product as intended.
- The warranty for the product or its part replaced during the warranty period shall cover the product or its part until the end of the general warranty period.